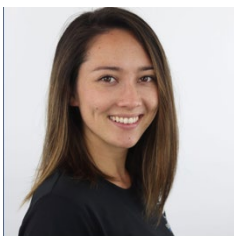




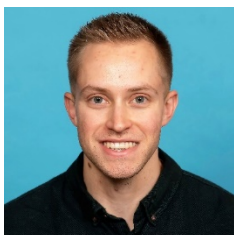
Foot & Ankle SIG News & Updates

Student Team Update: Congratulations to student team members Madison Engel, Stephen Cabebe, and Ethan DuClos, as they finish their DPT training and transition to clinical practice. Thank you for your contribution to the SIG, and wishing you so much luck as go on to new adventures!



The FA SIG student team welcomes Lena Parker, Cam Craver, and Olivia Nicholls (pictured from top to bottom)! Thanks to Cam and Olivia for their editing help in this quarter's newsletter.

Lena is a DPT student from Regis University in Denver, CO, class of 2022. Her interest in foot and ankle conditions stems from her experience as a classical ballet dancer. She is also an avid rock climber. "I am very excited to learn and grow with you all!"



Cam is a second year DPT student at Washington University in St. Louis. He has a desire to work with athletes. Fun fact: "I love to cook, but mostly love to eat!"



Olivia is a DPT student from Washington University in St. Louis, class of 2022. She has a background in athletic training and is passionate about orthopaedic and musculoskeletal conditions in physical therapy. "I am happy to be joining the team, and look forward to working with you all in the future!"

The FA SIG submitted our pilot practice analysis to the American Board of Physical Therapy Residency and Fellowship Education (ABPTRFE) for review in April 2021. We anticipate a review in May and then the final steps to complete the process will be in sight. This has been a huge effort by many over the last 2 years. We are very excited to receive the final review and then send out the practice analysis survey for the final time at the end of 2021. Although there is just a bit more work to do, it is exciting to think about the first fellowship trained foot and ankle specialists that could be joining the community in the very near future!

The FA SIG is leading an APTA independent study course monograph series and is looking for contributors. Please reach out with direct inquiries to Chris Neville at cneville@orthopt.org

The latest installment in the Author Spotlight series is on the FA SIG website (<https://www.orthopt.org/content/special-interest-groups/foot-ankle/author-spotlight>)! Abbis Jaffri sits down with Drs. Jay Hertel and R.O. Corbett to discuss their study, "An Updated Model of Chronic Ankle Instability."



Member Spotlight Featuring Abbis Jaffri, PT, PhD

Where are you originally from?

I am originally from Pakistan. I am licensed both in Pakistan and the United States to work as a PT.

What type of setting do you work in?

Currently, I am an assistant professor at Creighton University. Previously, I have worked clinically in both outpatient and inpatient settings.

What sparked your interest in the foot and ankle?

I believe that foot and ankle complex is the functional unit of locomotion, which is essential for all human activities. Any problem in the foot and ankle complex can be crippling and can have devastating effects on the quality of life ranging from a decrease in physical activity to neuromuscular deficits to psychosocial deficits. The complexity of foot and ankle unit was always fascinating to me, and managing foot and ankle conditions can be challenging. The complexity and the challenge associated with foot and ankle problems made me more interested in this field. My research interest is in improving quality of life by designing optimal diagnostic and treatment protocols for lower extremity problems, especially in the foot and ankle.

What is your current research interest?

My current research interest is investigating the neuromuscular adaptations in lower extremity muscles using ultrasound imaging. I also study balance, strength, and quality of life changes after foot/ankle problems. I envision my research to be more clinically applicable so that clinicians can easily incorporate it in their clinical practice.

How did you become involved in research/academics?

In my clinical practice, I used to see a lot of patients with foot and ankle problems, and my clinical practice sparked a lot of research questions which lead me to do my PhD and continue the line of research in foot and ankle clinical inquiry to answer long-standing questions.

What other activities/hobbies do you enjoy outside of physical therapy?

Before COVID, I would travel. I also read books, and play cricket and squash.

- Stephen Cabebe, SPT

FA SIG Updates

Member Spotlight –
Abbis Jaffri, PT, PhD

Footwear Review: If
the Shoe Fits...

Citation Blast – What's
New In Foot and Ankle?

Footwear Review: If the Shoe Fits...

As spring turns towards summer, people are taking to the outdoors for exercise and leisure. With an increase in outdoor activity comes the need for proper footwear. Not everyone chooses the correct footwear, especially for running, resulting in a variety of injuries of the foot and ankle. In recent years, a plethora of research has been done on the benefits and the drawbacks of various types of running footwear. The purpose of this article is to shed light on the proper way to fit footwear, and to provide the benefits and drawbacks of different types of running footwear to aid in decision making regarding footwear selection and patient recommendations.

A very important factor when choosing the right footwear is fit. A systematic review conducted 2018 pertaining to poorly fitting shoes found that 63-72% of participants had poorly fitting shoes (Buldt et. al.). Poorly fitting shoes were associated with foot pain and foot disorders. Footwear that is incorrectly fitted is linked to falls, foot pain, pressure lesions in patients with diabetes, neuromas, corns and calluses, and toe deformity (Barton et. al.). The aim of the study was to develop an evaluation tool for fitting footwear. More detailed information can be found in the article (Barton et. al.), but below are some brief takeaway points to be able to ensure proper fit.

- Length: There should be a thumbs width, or 10-22mm, from the longest toe to the end of the shoe.
- Width: Grasp the upper portion of the shoe over the metatarsal heads. If there is excessive bunching, the shoes are too wide. If there is slight bunching, the fit is good. If unable to be grasped, the shoes are too small.
- Depth: A shoe is considered too shallow if there is pressure on the dorsal aspect of the foot and there is no room for the toes and joints to move freely.

There is currently a substantial amount of varying research on different types of running footwear. Commonly referenced types of footwear in the literature include minimalist, maximalist, or traditional. Given that newer research has been done on minimal and maximal shoes, the benefits and drawbacks of those two styles are explored further.

Minimalist footwear is meant to replicate barefoot running, with a bit of added protection for the feet. Supporters of barefoot running suggest that humans should run with bare feet because that is how they ran hundreds of years ago. Minimalist footwear has gotten increased attention in the running community. Much of the current research regards this population and interpreting the data to make footwear recommendations may not be applicable to non-running populations. Additionally, there is weak evidence to support the data, and absolute conclusions cannot be made. Potential positives for minimalist footwear are that these shoes may improve running economy (Sun et. al), may increase the cross-sectional area and stiffness of the Achilles tendon (Sun et. al.), and they promote a forefoot or midfoot strike rather than a rearfoot strike, decreasing the stress impact on the hips and knees during running (Roth et. al.). Research also found that minimalist footwear may lessen symptoms of chronic exertional compartment syndrome and anterior knee pain. These benefits will only take place if there has been a proper, slowly graded, transition to minimalist footwear. Drawbacks to minimalist footwear include a potential load increase at the metatarsophalangeal and talocrural joints (Sun et. al.). Increased stress on the foot ankle secondary to minimalist footwear runs the risk of repetitive stress injuries (Roth et. al.).

Maximalist shoes are the opposite minimalist shoes. Maximalist shoes typically have a midsole that is greater than 30 mm to increase the amount of cushion on the bottom of the foot. The increased cushion is theorized to provide increased protection when running extreme distances. Softer midsoles can reduce impact forces, reduce loading rates, and attenuate shock during impact (Sun et. al). On the flip side, maximalist shoes may decrease sensation on the plantar surface of the foot (Sun et. al). An additional drawback of maximalist footwear is the change in spring-like running mechanics thought to increase impact loading (Kulmala et. al.).

There are pros and cons of each option. While this article further reviews minimalist and maximalist footwear, there are several styles of running shoes that fall somewhere in between these two extremes. There is moderate data to support the benefits of these shoe styles, and more research is needed to draw specific

conclusions to support the recommendation of either type. Use of clinical judgement is essential when recommending a style of running shoe to patients. Verifying the fit of footwear, rather than the type, is best practice, as there is significant evidence to support the importance of proper fit.

-Shon Kuhn, SPT

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Citation Blast – What’s New in Foot and Ankle?

Nigg BM, Cigoja S, Nigg SR. Teeter-totter effect: a new mechanism to understand shoe-related improvements in long-distance running. *Br J Sports Med.* 2021;55(9):462-463. doi:[10.1136/bjsports-2020-102550](https://doi.org/10.1136/bjsports-2020-102550)

This study aims to explain the “teeter-totter effect” seen in the Nike VaporFly 4%, a shoe that has gone on to break world records in the 100 km, marathon, half marathon, and 15 km distances. The namesake of this style of shoe comes from the curved carbon fiber footplate embedded in the midsole of the foot. The shoe design encourages anterior translation of the ground reaction force during strike, and thus promotes an upward “reaction” force of the heel in later stance stages. This fulcrum force is thought to improve running economy by 4-6%. This mechanism, compared to other new features of the Nike Vaporfly 4% such as the increased midsole height, is thought to be the main contributor to improved running speed. In addition, this shoe does not violate any regulations established by the International Association of Athletics Federations (IAAF).

Nozaki S, Watanabe K, Teramoto A, Kamiya T, Katayose M, Ogihara N. Sex- and age-related variations in the three-dimensional orientations and curvatures of the articular surfaces of the human talus. *Anat Sci Int.* 2021;96(2):258-264. doi:[10.1007/s12565-020-00585-5](https://doi.org/10.1007/s12565-020-00585-5)

This study aims to observe the orientation and curvature of the three articular surfaces of the talus in relation to sex and age based on computer tomography to identify possible morphological factors of the higher prevalence of foot disorders in females and elderly populations. 56 participants were involved in this study. The orientations of the talocrural, subtalar, and talonavicular joints were quantified three-dimensionally by calculating normal and principal axes of the articular surfaces defined by plantar approximation. The talonavicular surface was significantly more twisted in the frontal plane and less adducted in the transverse plane in females than males. With aging, the subtalar articular surface was facing significantly more posteriorly. These identified changes in talar morphology with aging could potentially lead to a higher prevalence of foot disorders in the elderly.

Feger MA, Donovan L, Herb CC, et al. Effects of 4-week impairment-based rehabilitation on jump-landing biomechanics in chronic ankle instability patients. *Physical Therapy in Sport.* 2021;48:201-208. doi:[10.1016/j.ptsp.2020.07.005](https://doi.org/10.1016/j.ptsp.2020.07.005)

Previous studies have demonstrated that individuals who suffer from chronic ankle instability (CAI) have greater ankle inversion, ankle plantar flexion, and reduced knee flexion upon landing from a jump. Physical therapy rehabilitation aims to improve range of motion, strength, and motor control to reduce suboptimal jumping biomechanics. This study uses surface EMG on select lower extremity musculature to determine if a 4-week rehabilitation program is effective in reducing pathological movements in a jump-landing strategy. The study involved 26 individuals who participated in a rehabilitation program consisting of exercises to improve ankle range of motion, strength, 4-way manual ankle resistance, 4-way walks, balance, and functional activity performance. The results show that four weeks of progressive impairment-based rehabilitation for CAI that addressed range of motion, strength, postural control, and functional rehabilitation resulted in small to moderate improvements in total frontal and sagittal plane kinematic excursion at the ankle, knee, and hip during bilateral jump-landing.

Greene BD, Smith SE, Smith JT. Snapping Plantaris Tendon: A Rare Case in a Competitive Dancer. *J Am Acad Orthop Surg Glob Res Rev.* 2021;5(5):e21.00008. doi:[10.5435/JAAOSGlobal-D-21-00008](https://doi.org/10.5435/JAAOSGlobal-D-21-00008)

The researchers describe the case of a 15-year-old competitive ballet dancer who presented with a sharp, painful, snapping sensation in her left posterior heel. Her pain had developed over several weeks without a specific traumatic event, change in activity, or shoe-wear. This snapping sensation was located slightly medial to the Achilles tendon and occurred when squatting. She reported dancing daily almost year-round and denied previous lower extremity problems. Six weeks of rest from dance, soft tissue mobilization, and eccentric training failed to reduce the patient’s

symptoms. Upon further investigation, the dancer's plantaris tendon was subluxing from an area medial to the Achilles tendon to a more posterior position. A tenotomy was performed to remove the plantaris tendon, which delivered excellent results. By 8 weeks, the patient had returned to near normal dance activity.

Noor A, Waris A, Gilani SO, et al. Decoding of Ankle Joint Movements in Stroke Patients Using Surface Electromyography. *Sensors (Basel)*. 2021;21(5). doi:[10.3390/s21051575](https://doi.org/10.3390/s21051575)

The COVID-19 pandemic resulted in the advancement of telehealth and technologies that patients can use at home to maintain their physical therapy protocol. This study explores the potential use of surface EMG in a home-based lower limb rehabilitative program for stroke patients. EMG is often used as a biofeedback tool in this population and can be effective in both reducing spasticity through observation of electrical activity and improving motor recruitment in cases of flaccidity. 11 males with post-stroke hemiparesis participated in this study. Electrodes were placed on the tibialis anterior, gastrocnemius, and peroneus longus of the paretic side. Participants were taken through a series of ankle exercises while the participants observed the recording on the EMG. Results show that participants were able to interpret ankle joint movements from sEMG data, thus reinforcing proper muscle activation in specific ankle movements. This can benefit patients with a history of stroke who have difficulty with proprioception, motor initiation, and functional activities associated with specific ankle motions.

-Lena Parker, SPT

